

## 477.1

**ENLARGED SHEET.**

[OCTOBER 12.

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Read before the Geological Section of the British Association, Sept. 26.]  
[Communicated by the Author.]

The subject of mining records has been already brought before the meeting of the British Association, and at the meeting held at Newcastle, Mr. Sargison submitted a paper, entitled "Suggestions on the Practicality and Importance of Preserving National Mining Records"—the result of which was, the appointment of a committee to draw up a memorial to be communicated with Government, and subsequently, the adoption of a resolution then recommended, and the establishment of the office of Mining Records, attached to the Museum of Economic Geology. It is

especially that a considerable number of important documents might be accumulated in the course of time in this office, but it is believed that such a possibility is quite inadequate to meet existing circumstances, and that no regulations ought to be enforced by authority of Parliament, so that underground operations now in progress should be recorded, according to some general plan, and the knowledge of these operations handed down in such a form as to be available in future years. In this way only can the adventurers learn what portion of a mining district is actually worked, where dangers may be anticipated by coming in the way of old workings, and what prospect there is of success in the prosecution of work untried. The want of such information is not only greatly injurious to mining property, by leaving open a doubt with regard to matters so important, but in many cases it is the cause of serious danger to human life, as the wastes or worked out spaces left in mines have become the receptacles of great accumulations of water, or are loaded with the noxious gases that exude from the mineral produce. The object of this communication is to direct attention to the extent to which the mining interests of the land would be promoted by the establishment of a general system of mining records, to show that Parliamentary interference is imperatively demanded, if any satisfactory result is to be attained, and also that the efforts of the British Association are likely to be successful, if the proper means are taken, whether by suggestions to Government as to the most advantageous method of proceeding in, or by pressing on public attention the real importance of the subject, and inducing the Government to act upon the necessary inquiries. The benefits to be expected from the possession of a system of mining records will be best understood if considered, first, with reference to the miner directly, who is thus enabled to learn what he may avoid danger—and then in the application of geological facts to operations to mining, which is chiefly difficult and doubtful because observations on record are, in comparison with what they might be, so imperfect, and so unsatisfactory. The phenomena relative to the sequence, direction, and condition, of mineral veins, have, indeed, been almost totally neglected till within a few years, in England; and, while this has been the case in our own country, in Germany, on the other hand, such matters have been recorded in a systematic form, even from the close of the sixteenth century. It is undoubtedly the case that the application of geology to mining has been hitherto so unsatisfactory, and so little depended on, because there has ever been a want of accurate and reliable information concerning phenomena which have been repeatedly noticed and forgotten, and many of which can never be recovered—while at the same time a very large proportion of mines are so worked, that no useful information can be obtained from them, unless everything, as it occurs, is carefully noted down, and faithfully recorded. But it will be asked, perhaps, to what extent these records are required, and how far they are capable of being obtained from those persons who are usually entrusted with mining property. They are simply these observations which every owner of a mine ought to be enabled of managing and overlooking the workings of a mine ought to be able to make, since without them the excavations cannot be safely carried out. It is not on such observations as records of observations that are required, and the facts themselves should be known, either to the proprietor or to the overlooker of every mine, that he may be aware how much valuable mineral produce is abstracted from the bowels of the earth, and the position of that which is left. The information thus obtained is, however, of great interest to the geologist, who wishes to make himself acquainted with the conditions under which the mineral produce exists.

very appeal to that amongst the members of the association who best understand the subject, whether even the work of the Ordnance Geological Survey can be considered complete, or whether the full benefit can be reaped in that important and national work, unless some system of recording underground phenomena observed in mining be very soon adopted. It seems clear that whatever is to be done by the geologist for the benefit of the miner, must depend, not doubtfully and indifferently, but evidently immediately, on the number and nature of the phenomena recorded, on the accuracy and completeness with which the records are kept, and is also evident that the greatest benefit will be derived from a systematic record of similar phenomena in various mining districts, during those operations which can only be carried on by a large expenditure of capital and labor, and in the anticipation of a profitable return for the outlay; there-fore, in every reason why these observations, which must be made, should also be recorded, were it only for the immediate interest of the mining proprietor. With respect to mining operations now in progress, there are, indeed, many ways in which records, such as it is proposed to keep, would be extremely useful. The drainage of one mine is not un- frequently resolved into other works in the vicinity at a somewhat lower level—and this is the case, not only accidentally, but often (there is reason to suppose) wilfully, on unscrupulous and dishonest grounds or with regard to the rights of the mine owner. A neighboring proprietor has sunk to the deeper portions of a mine or vein, and then commencing his part of the work, allowing the water to drain into his neighbor's property. I have reason to know that this is not a hypothetical case, but is rather looked upon in some districts as a piece of ingenuity to be practiced whenever occasion offers. Besides this, there is another reason why such records should be enforced as a protection against dishonest mine owners, as it is not unusual in some parts of the country, where little capital is required in undertaking to work a mine, that men of no resources rent a property on speculation, paying a few pence a day for coal extracted, and then extend their underground workings beyond the limits over which they possess a right. The coal thus dishonestly obtained is sometimes a very considerable quantity, and as the mines sitting in this way do not allow their mines to be visited, or their driving plans, if there are any, to be examined, there are no means by which the neighboring proprietors can be certain whether they have been drilled or not, without applying to the Court of Chancery to enable them to investigate the case, or else sinking a shaft, and working their own portion of the mine at an increased time, or in an unprofitable manner. In either case the expense incurred is very considerable, and the thief, who dis- covers, is rarely in a condition to restore the value of the property stolen. While this wicked interference with the property of others, the absence of a drainage plan, and the ignorance of the persons employed, has, in some cases, been the cause of extensive trespass being committed, and very heavy losses incurred in litigation, better any arrangement could be effected, than to resist their great ones, and accurate underground surveying, necessary to prevent the occurrence of such cases.

its regard to mining operations that may be hereafter undertaken, are able to form some idea of the advantages of *miners*, by considering the extent to which they are needed in works started on a new or every mining district. The living able to great excavations made by former miners, and in whose worked out and neglected, is one of the most important of the advantages. Antidotes arising from ignorance in this respect are *misconceptions*, and are accompanied by such extensive loss of property of human life, that every one acquainted with mining operations will at once recognize the great necessity there is of some measures which such accidents may be prevented for the future. No less than three mines on the River Tyne, in the immediate neighbourhood of Newcastle, have been either worked out or relinquished within the last year, and of those six months are kept, notwithstanding that some

years ago a serious accident took place, owing to the irruption of water into the Heston Colliery, the water having accumulated in some old workings which had been relinquished seventy years. It is also a matter of no little economical importance, that in some cases, owing to the want of records, a coal-pit has been sunk, and other expensive operations carried on, upon a wrought-out seam of coals. But, besides the advantage of being able to avoid the danger and mischief arising from a too near approach to these old workings, the rapid improvements that are constantly taking place in machinery, and the discoveries by means of which mineral produce at one time useless may at another be of some value, render it extremely desirable that the circumstances under which old works are abandoned should be in all cases clearly recorded. It is, however, certain that this will never be done by the persons about to relinquish the working of the mine, because they will not put themselves to expense for that which they, of course, suppose is valueless, and it is only by some general legislative Act that the result so desirable can be attained.

I may, perhaps, be permitted to state here the practice in Saxony mines with regard to this matter, as an instance of what has been thought right and necessary in the country where the whole detail of mining operations has been carefully studied, and made the object of a legal code. In Saxony, "when a mine is to be abandoned, an officer called the 'Superintendent of Mines,' and others whose duty it is to inspect the mines from time to time throughout a district, and report on their condition, visit the works, detach portions of ore if any is to be obtained, assay the ore, note its condition and value, and mark down these observations on a ticket, which they attach to the specimen, and which it is their duty to preserve carefully. They register, in a book kept for the purpose, all the circumstances which have led to the abandonment of the mine, mentioning the magnitude of the vein, the hardness of the rock, the proportion of ore it contains, the depth of the workings, the nature, direction, and magnitude of the galleries, and the distance to which each has been carried." It need not be mentioned, that an accurate map of the underground works in each level is also preserved, and such an account of the appearances of the surface that the mine and each shaft can at any time be identified.

I beg now to submit a few of the reasons which render it not only expedient, but absolutely necessary, that the preservation of such mining records as are of greatest importance should be provided for by a legislative Act, and that for this purpose there should be a representation made to Government, on the part of the British Association, and a method pointed out by which the object in view—that of enforcing the registration of mining operations—may be best accomplished. The careless indifference of those who have only a temporary interest in mining property is one reason why such interference is necessary. Under ordinary circumstances of mines leased to adventurers, and paying a royalty to the landowner, it is often thought quite needless that plans should be prepared of any parts of the work not actually in progress, and far from there being complete plans of the mine on each level, or at each seam, there are often only a few detached sketches, carelessly and imperfectly made, and not regularly continued; and although, in the great mines of Cornwall, and in many detached properties, a far more complete system than this is followed, yet the absence of any general plan renders these less useful than they would otherwise be, and the want of knowledge of the intermediate works destroys with a great part of their value. But the jealousy of small mining adventurers is a yet greater obstacle than their carelessness and indifference. There is always extreme difficulty in inducing such persons to recognise the advantage that they themselves would derive in knowing exactly the state and progress of their works at any time, and the difficulty is still greater when they fancy that their neighbours and rivals would also learn their movements. I have already remarked upon the dishonest practices which the compulsory registration of mining records would greatly tend to prevent, but I may state here that the possibility of such knowledge being taken advantage of, in manœuvring the drainage of a mine, has been mentioned to me as an objection which would have some weight amongst certain classes. I need hardly point out, that the very expression of such a fear is a sufficient proof of the necessity of doing something—while it is, at the same time, an intimation of the kind of opposition that may be offered to the measure. The want of an uniform system of recording the phenomena of mining in different parts of the country is another reason why some well-digested outline of the kind of records required should be sketched out, capable of being filled up in detail in each district, and so planned that the habits, the degree of knowledge, and even the prejudices of the various persons interested in the mining property in the district, might be consulted in preparing the question in detail. Unless, however, the supplying the information required was made compulsory, there can be no doubt that many individuals would decline to assist, and the system, as a whole, be imperfect, unsatisfactory, and little to be depended on.

The need of Parliamentary interference is, however, felt, not only in insuring the establishment of an uniform system, recording the proceedings and relating state of mines actually in work, but still more with reference to those about to be abandoned; for, as I have already remarked, the circumstances under which mines go out of work must, in almost every case, be precisely those rendering it unlikely that the persons interested would willingly put themselves to any trouble or expense about the matter. They have ceased to expect any favourable result from further workings, and they are rarely likely to make any exertion unless they are required to do so by some legislative enactment. But, if it is thus important that Parliament should interfere, for the purpose of ensuring the preservation of a series of mining operations, it appears to be the duty of the British Association to consider in what way the matter may be best recommended to the notice of Government, and to recommend it with the most earnest and pressing representations; for it cannot be expected that, if introduced without the authority of a representation of this kind, and without presenting a well-arranged plan of operations, likely to meet with the general assent of mining proprietors, a law, one object of which would be to impose restrictions on the management of a particular kind of property, will be received with the degree of attention which it certainly merits. It appears, indeed, to be the duty of the Association, as less than its highest privilege, to express itself thus, as the organ and representative of science in England. By it, scientific men can most powerfully, most immediately, and most usefully, assist the Government, and express their opinion concerning the importance of the investigations they are engaged upon, and their bearing on the practical pursuits and enjoyments of active life. As, therefore, no formal applications can be made so effectually as those recommended at the annual meetings of the Association, and since the applications thus made have met with almost invariably success, there is every reason why this subject of mining records, once practically important than any that has yet come before the notice of the Geological Section of the Association, should be most carefully considered and advanced in every possible way. But there are yet additional reasons why the subject should come before the notice of Government through the British Association. There has not yet been projected any well-defined plan of the nature and extent of the records required, or of the machinery by which the information most needed could be at first collected, and afterwards arranged and rendered available. It is probable that this might be done—at least, to a very considerable extent—by a committee of members of the association putting themselves into communication with the principal mining proprietors who take an interest in the subject. It appears from the result of a public meeting that has lately been held in the north of England, that every assistance would be given by the coal owners and coal viewers in that district, and there can be little doubt of much valuable information being procurable from every province of experience and local knowledge in Cornwall, and in the other mining districts of England.

The first step towards the attainment of mixing records has been already made at the instance of the association, and an office is provided for the reception of these documents, forming a most important adjunct to the Museum of Comparative Zoology. It is most desirable that the important sources and its office should be better known, and more extensively used, and it may safely be said that there is no one department of practical zoology so important to the biologist as one so ably serving, for there is none in which so many important specimens deposited, or in the efficient attainment of which zoology, both as a science, and as leading to practical questions, is more likely to be useful.

The necessity of preserving some records of the progress of underground operations in our mines and collieries, though admitted during the past con-

The necessity of preserving some records of the progress of underground operations in our mines and collieries, though admitted during the past century by nearly all parties interested in mining property, and strongly urged by a few during that period, as a national question, the subject has ever again been lost sight of, and we are as far from a general and systematic plan of preserving data for future knowledge of the circumstance, situation, and nature of our mines, as we were a hundred years since, and nothing less than a Legislative enactment will ever ensure the general and cordial co-operation of the owners of mining property. A pamphlet has just appeared from the pen of Mr. Sopwith, of Newcastle-on-Tyne, in which he has embodied the substance of the opinions expressed on the subject by some of the most eminent geologists and experienced miners during the past fifty years, with some further observations, illustrating their national importance as involving, if further neglected, the deterioration and eventual loss of a large portion of the mineral wealth of the country. It appears that as long since as 1797, Mr. W. Thomas, of Newcastle, read a paper, at a meeting of the Literary and Philosophical Society of that town, on the propriety of establishing an office "for collecting and recording authentic information relative to the state of the collieries in the neighbourhood, and the progress that has been made towards ascertaining the nature and constitution of the strata above those strata to which the workings in this country have been confined." Twenty years afterwards a committee of the society stated that the proposal he had made, "though highly approved, and partially encouraged, fell in the ground." Mr. Thomas's observations were again read on the 6th June, 1818, accompanied by a paper from the late Mr. W. Chapman, engineer, both of which were published.

Mr. Thomas's paper, after recommending the institution of an office for the deposit of mining records, he observes, that when the information which it will be the business of such an office to collect and arrange shall have been carried to some degree of maturity, by connecting the different parishes in the district, with the knowledge (as far as it has been obtained) of the nature of the strata which compose each respective division of that parish, a regular history of the various seams of coal existing within each division may be drawn from such information. By this means, a considerable expense in the article of boring, for the purpose of ascertaining the existence and depth of coal, will, in a great measure, be rendered unnecessary—the time employed in that tedious process by very much abridged—and an eventual finding much sooner accomplished. Another considerable advantage to be obtained by this edictive information, is the knowledge which will be thereby acquired with respect to the nature, situation, and direction, of the various dykes and interruptions which have been met with in working the various collieries, and thus neighbouring collieries may be rescued from a too fatal scarcity, and led to make preparations to meet approaching evils. The history of the various seams will naturally grow out of this plan—a history gathered from authentic documents, which presents many advantages; but the more important consideration seems to be the transmitting to posterity authentic information relative to every particular waste, and the full extent of the workings in the respective seams. In the remainder of the paper, Mr. Thomas enters into the details of the excavation of such places, but they solely relate to the collieries near Newcastle.

Mr. Chambers, in his paper, read in 1810, observes, that the philanthropic and beneficial plan of Mr. Thomas embraces not only the saving of much useless expense to future adventurers, but also the prevention of loss of lives on the annual and unexpected breaking in of old wastes of coal seams, and the disastrous effects thereof, either from the sudden eruption of vast bodies of water, or the explosion of carbonated hydrogen. Having remarked on the serious points of Mr. Thomas's paper, he next considers how these documents are to be obtained, and how to render them permanent, however, so the credit to be derived is of far less importance to the present than to future times, he also expressed a fear that nothing but a public law would be productive of the end desired.

The various points or changes to be embodied in the Act, he suggests as follows—viz., 1. That on the conclusion or relinquishment of the working of any seam of coal, the owners shall within twelve months lodge with the Clerk of the Peace a duly authenticated and correct plan of the said wrought out, or relinquished, seam of coal, distinguishing each part as are wholly worked out, or those where pillars are left standing; and also the following particulars—viz., 1. The direction of all the dykes or fissures intersecting the seam; 2. The position and denomination of all the pits; 3. The precise boundaries of the colliery, so that the unwrought parts and extent of barrier may be seen; 4. Every drift into these unwrought parts to be correctly delineated, as to its direction and extent; 5. That the direct line of dip be denoted by strong pointing in the direction of each dip, each arrow accompanied by its notation of declivity, or by its number or mark of reference; 6. A delineation of all the roads and brinks, and the position of such permanent objects as are remarkable—viz., churches, mills, bridges, large houses, &c.

Had Mr. Thomas' views been carried out in 1797, the public would have seen in presentation of the plans and records of the following relinquished, wrought-out, collieries since that period—viz., Walker, St. Anthony, Lawson's Main, Felling Colliery, Gatehead park, Flatwood, Higgs Main, Long leaton, and Krasan—all east of Newcastle, and westward of the same, Baker's Main, Throckley, and Heddon hill. England, it appears, is far behind every other mining country in the regulations of her mines. The coal mines of Liège were exhaustively wrought when those of this country were in their infancy; and, so early as the first part of the eighteenth century, if not earlier, the producing of coal mines was under legislative regulations, and subjected to inspection and control in their workings.

in pursuing the aspect, Mr. Dagwell observes, that the utility of recording subterranean operations has been much undervalued by persons unacquainted with mining details, as well as by many of the less informed class of mining adventurers, who are with difficulty brought to perceive the advantages, or to adopt the practice of any system to which they have been accustomed; hence the plans of miners in this country are generally confined to such particulars only as are indispensable for conducting the subterranean works, without any reference to the past history and future prospects of the mine, or any sufficient record of the strata or geological features, the accumulation of such a mass of practical information, would, in time, prove of considerable benefit, and eventually obtain that consideration to which it is so much entitled. Among other causes which have retarded the progress of improvement in mineral places and sections, as well as other regular details of subterranean operations, the speculative and uncertain nature of mining is one of the principal; but mining, though speculative, is not entirely the work of chance—in it, as in all other pursuits, he who classifies his accounts, and can at any time readily ascertain the exact sources of expenditure and income—who derives experience from the constant communication of facts, and can comprehend the whole extent and object of subterranean works, possesses very superior advantages over those who have no such data. The state of the mines of the Forest of Dean, and the improvements, after the passing of the Dean Forest Act, the legislation, is that, from a ruinous state in an unsettled and well conducted system, presents a striking evidence of the state of mining generally, without which no such amendment could have been effected; this case is truly a type of what exists in a greater or less degree in almost every part of the kingdom, and the object of the author is to show that the continuance of such a state of things is disadvantageous to us as a nation; and that it will result in the loss of much valuable property—more money and immensity fatal accidents—materially lessen the productivity, and shorten the duration of our coal fields and other sources of mineral wealth; and it leads to national litigation—in very frequent and serious injury to the rights of private property; that it is, in short, a public injury of the most serious character—wasting the dearest treasures on the part of the Government, not leasting more than any other subject to touch even this great prospectus within the sad issue as truthfully and eloquently expressed by him, that "states and empires have their periods of decadence, and that to rely hence what states and empires do." The Forest of Dean Act occurred in the Royal Assent July 27, 1856, and, although it was deemed almost impossible to arrive at any satisfactory conclusion, in the three years elapsed thereon, yet, from the measures adopted to obtain perfect plans and sections of the Forest sections, that the three years were the whole time which had elapsed on the commitments were entirely completed, in the entire completion of all the three great interests affected by their enactments, the same proceedings were entirely based on the mining records which the Dean Forest and Forests had caused to be prepared, and as not one step could have been taken without them towards the settlement of the mining records of the Forest, it is important, as an example, to show the necessity of such a plan of legislation. Other striking instances of the value of mining records could be shown, but they generally are connected with the general interests of agriculture.

Mr. Rogers then alludes to the establishment of an office of Mining Affairs in the Bureau of Economic Geology, and which would tend to expedite as a most satisfactory step towards the objects which it is the purpose of the pamphlet to achieve: continued, however, as to this institution, it is the evident that no material progress has yet been made towards the



received the deposition. Allusion had been made to Denmark; he could not, therefore, better conclude than by quoting the words of Mowbray: " 'Tis not in mortals to command success; But we'll deserve it."

Mr. Elms then gave an interesting description of the Kiel and Altona Railway, and the prospects of the Gluckstadt Harbour and Dock Company, the objects of which were to afford additional facility to the commerce of Germany, Central Europe, and the countries bordering the Baltic Sea, to expedite personal communication with Copenhagen, Norway, Russia, and the north of Europe, by the formation of a new dock at the port of Gluckstadt, on the Elbe, in connection with the railroad now forming, that will shortly communicate with the Kiel and Altona Railway, now nearly finished, thus effecting a junction of the Elbe with Kiel to the north, and Hamburg to the west of Altona.

### IMPORTANT MEETING AT HARWICH.

Captain DRAKE then came forward, and was loudly cheered. They had, he said, experienced many difficulties with regard to their railroad from the rivalry of companies, but in steam communication by sea they could have no rival. He knew Harwich well, and he asserted that the capabilities of the harbour were inferior to none in Great Britain. It could hold in safety every steamer necessary for the defence of the kingdom, and it could be approached at all times and all tides, by night or by day, in fogs or in storms. (Loud cheers.) He was of opinion that the proposed company would be of great service to Harwich; at present they were at low-water mark, but he hoped the flood had now come that was to lead on to fortune. (Cheers.) The gallant captain concluded by proposing a resolution, recommending the European Steam Navigation Company to

Mr. COTTINGHAM seconded the resolution, which was carried unanimously and great applause. Thanks were then voted to Mr. Bagshaw, and his wife, the Mayor, and the meeting separated.

**MASTERS'S PATENT ICE MACHINE.**  
*Mr. J. B. Sweeting, sole agent, 119, Chancery.*

Securely a week elaps, but we are called upon to notice some new application of science to the requirements, the comforts, or the luxuries of civilized life, and it is long since we inspected with greater pleasure, the results of any scientific invention, than this machine for the production of all the varied comforts, and, in medical cases, most important accessories, which are obtainable by the use of ice. By this elegant apparatus, which we now have in daily operation at No. 159, Chesapeake, and which is most simple and economical in its effects, every description of ice for the table can be prepared in a most superior manner in a few minutes;—and while the refrigerating process is being completed, a cylinder of opaque ice is forming, which, when inserted in an elegant Japanese case made for its reception, may be placed on the table, and is capable of holding four bottles of wine, thus keeping them cool to the last drop; they certainly form a most richly adorned ornament for, and useful adjunct to, the dinner table, and, from their unique and elegant appearance, are an ornament even to the drawing-room. The apparatus for this purpose, which for the table, consists of two concentric cylinders, the space between which holds the water to form the cylindrical block of ice, and is about two inches wide; within these again, which are of tinued steel iron, is another containing a fixed wooden spatula, having an opening over its centre from top to bottom, and round which the cylinder of pure water revolves freely as on an axle; the space between the inner and this revolving cylinder is about four inches, and in which is placed a mixture of ice and mixture of soda, in proportion by weight of sixteen to the former to five of the latter (the outer space being previously filled with water); the revolving cylinder is connected to a train of wheels in the bottom of the machine, and is placed within it the cream, jelly, or other substance to be lard, and by which handle giving it a rapid rotary motion, its action is powerfully similar to a churn, and in a few minutes the contents are luxuriantly commingled, and run then be placed in moulds or glasses, thoroughly frozen. This operation may be continued or not, as required, and in one hour the outer cylinder may be opened, the cylindrical block of ice (which will then be found perfect) taken out for use, and the space again filled with water to repeat the process; one of these ice cylinders will last in a cooling receiver about four hours. The following testimonial from Dr. Ryan will show that we are not unjust in our favourable view of this beautiful invention:—

28, Commercial Street, Portland Square, Sept. 28, 1864.  
 My Dear Sir,—Having had several opportunities of observing your method of  
 using artificial ice and ice cream, by your patented machinery, I cannot avoid  
 expressing my delight at the rapidity and perfect success of the whole pro-  
 cess, and the beauty of the ice, and the perfect preparation, you formed for my  
 refreshment. I have, I believe, never before seen anything so perfect, so  
 really elegant, so beautiful, and so delicious. In the same machine, and by the same pro-  
 cess, an immense block of compressed ice, in which you had imbedded lemon and  
 lime fruits, giving the whole a most beautiful and unique appearance. In fact,  
 my curiosity being so first that you employed merely pure water, and it was  
 really wonderful to see such a fine result. I have seen this machine in use in  
 my own dining room, this beautiful delivery, I am sure, is the best of its  
 kind, and by means of such profitable and elegant machinery. To the public, profession,  
 my exceedingly high appreciation, for you now create them at all seasons,  
 that in the crowded street wards of the beautiful, or in private practice, to ob-

Another part of the invention consists in a somewhat similar apparatus for drying water and other liquids, &c., without the aid of fire, and will prove a useful piece of furniture for residents in warm climates, or in places where fire is not attainable. We cannot give so clear a description of this as former, but there is a third cylinder, three forming two spaces (boundaries for the freezing mixture), in the outer one of which is placed powdered charcoal, or other non-conductor of heat, and in the inner one the water is frozen; the power cylinder for the jellies, &c., is similar to that we described, having on its lower exterior surface three wings, which, by rapid rotation, agitate the freezing mixture, being, in this case, water, a chemical compound of three or four ingredients, which produces the effects as to ice and mortals of soda is the other machine. The quick and labor saving production of this grateful luxury in all weather and in every place will be found productive of the most gratifying results, the facility with which they are produced, should be seen to be appreciated, and we feel satisfied on its being brought before the public, it will be

patronized by the nobility, gentry, medical practitioners, hotels, restaurants, and all persons who are in the habit of making tea in the privacy of the interior or the necessaries of life.

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DR. FAR AS A PAINT.—Dr. Charles Horner, of the Manhattan Garden, New York, recommends the use of emerald for painting fences, buildings, &c. "It never alters by exposure to the weather, and one or two coats will last many years." It is the cheapest and best black paint that is used. Our buildings are painted with it, all are vigorous also, and the wrought iron can be placed in the ground or covered with it; I think advantage would be taken if it could be generally used throughout the island. The Government could the better use in brilling the feet of the New in this tree, which render them impervious to water, and pests and with it are protected from rot when put in the ground, as otherwise they had been checked."

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FROM LEWIS BOST.—About twelve months ago a salamander was released from the incarceration of an iron life boat, by Mr. Roberts; this boat,

balanced, was a clear thin glass, enclosed in tinplate, the pressure of a piston actuated for the purpose, who delivered 5.5 lb. to piston, and, consequently, it was as good as the part for service, be rise of wind; 3 lb. of cast iron, about 10 in. in length, and 3 in. in breadth, covered the air in divided into three compartments, perfectly distinct from each other, so that any working happening to one of them, would not affect the increased, self-acting valves but in or out each quantity of air was required to preserve its equilibrium, according to the weight, with it may be changed, only, by means of a water-proof cloth, or arrangement, to counter the action of the piston, maintain the possibility of its movement by shipping water.

...and, moreover, it is the only one which has been found to be effective in all cases of poisoning with strychnine. It is also the only one which is not destroyed by heat, and therefore it can be used in all cases of poisoning with strychnine.

The following are the symptoms of poisoning with strychnine:

1. Numbness and tingling in the extremities.

2. Stiffness of the muscles.

3. Convulsions.

4. Death.

The treatment of poisoning with strychnine consists in the administration of emetics, followed by cathartics, and then by the administration of antidotes.

The antidotes which have been found to be effective in all cases of poisoning with strychnine are:

1. Potassium permanganate.

2. Potassium dichromate.

3. Potassium bichromate.

4. Potassium chromate.

5. Potassium manganate.

6. Potassium hypomanganate.

7. Potassium metavanadate.

8. Potassium metaborate.

9. Potassium metasilicate.

10. Potassium metaphosphate.

11. Potassium metaphosphate.

12. Potassium metaphosphate.

13. Potassium metaphosphate.

14. Potassium metaphosphate.

15. Potassium metaphosphate.

16. Potassium metaphosphate.

17. Potassium metaphosphate.

18. Potassium metaphosphate.

19. Potassium metaphosphate.

20. Potassium metaphosphate.

[illegible]



GEOLOGY OF SCOTLAND.—No. I.

The variety and importance of the phenomena presented in the geology of Scotland, has for years attracted a considerable share of attention, and to which it is justly entitled; yet, with the exception of a French work by Dr. Boué, and that but imperfect, no systematic treatise on the subject has been attempted. It is to supply this deficiency the author has undertaken the present volume, and he has succeeded in giving a summary and condensed view of the remarkable facts to be observed, and of the highly interesting features which are presented in the general mineral character of that country: the volume is an exceedingly interesting one, and well worthy of attentive perusal. We shall make an abstract of the work, with the view of giving our readers some general information of the geological phenomena and mineralogical features of Scotland and the Scottish Isles. The main land lies between 54° 38' and 58° 46' 30" of north latitude, and 1° 46' and 6° 8' 30" of west longitude. Its extreme points are Dunnet Head on the north, the Mull of Galloway, Peterhead east, and Ardnamurchan Point on the west. Its length from the Mull of Galloway to Dunnet Head is 280 miles, and its extreme breadth from Buchanan's to Rowanmore, in Ross shire, 150 miles; including the numerous islands, however, Scotland is of far greater extent—Lambay, in Ulster, the most northern of the Zetlands, being in north latitude 60° 49', and St. Kilda, the most remote of the Hebrides, lying in 8° 35' west longitude. The superficial area of the main land is estimated at 26,142 square miles, of which 290 are covered with freshwater lakes, and that of the islands 3375—in all, 29,787 square miles, having eleven square miles of surface to one of sea coast, while in all Europe there are twenty-five miles of surface to one of sea coast, and in the other quarters of the globe still more, and these circumstances, doubtless, have considerable influence on the moral character and physical condition of the inhabitants. The mountains and valleys of Scotland, of which nearly its entire surface is composed, are divided by the author into two distinct and well-connected systems, the first exhibited in the south and east of the country in the chain of the Cheviots, and in the great southern mountain land, traversing the whole island from Wigtonshire on the west to St. Abb's Head on the eastern coast. The Pentland Hills form the northern secondary chain, continued towards the east in the Firth Hills and Arthur's Seat, and Tinto, Mount Stewart, the Haughshaw Hills, &c. in the west.

Having noticed the various rivers, the author proceeds, arranging the division of Scotland into three separate regions—the more designation of highlands and lowlands not being sufficient for geological purposes. On entering Scotland from the south, a region of transition rocks presents themselves, rising into high hills, with rounded forms and flat tabular summits; descending on the other side this mountain chain, a region of an entirely different aspect is arrived at—richer, but more tame; the narrow valleys are replaced by open plains, mountains by undulating ridges, or hills, often isolated, and generally conical. The rocks are of the secondary formations—sandstone, shale, coal, ironstone, and trap, while the carefully cultivated fields and dark columns of smoke between a denser population based in arts and manufactures: this is the second division. Continuing northwards, another chain of mountains towers above the plain, more broken, serrated, sterile, and desolate—hilly mountains, covered by naked moss or brown heath—frowning precipices, unimproved by the hand of time—narrow glens, where the river flows through its rugged bed worn in the solid rock—wild spots, where the torrent dashes for a time in some deep lake—and black moors, only diversified by moss grey stones, form the leading features of the scene: this is the third region. The first he terms the southern, or transition, comprising 5100 square miles; the second the central, or secondary, 5000 square miles; and the third the northern, or primary divisions, comprising an area of 16,000 square miles, or, with the islands, 19,500 square miles. The second division, though the smallest, is the most populous, and its mineral resources are of the greatest importance, containing, probably, three-fifths of the people, and nine-tenths of the mineral wealth of the kingdom. In the first division, all the transition strata, except the limestone, are, in most cases, more varieties of one great argillaceous deposit, formed from the debris of former rock formations; however widely the finer shales may differ in appearance from the coarse conglomerate greywackes, yet it is exceedingly difficult, if not impossible, to point out any definite line of demarcation; one and the same bed gradually passes from the fine to the coarse rock, and from the coarse to the fine, both in a vertical and lateral direction; the flinty slate and shaly slate are the only ones regarding whose position much doubt can be entertained, and probably they ought rather to be placed among the altered or modified deposits (they constitute, however, but a small part of the formation). The most common variety of greywacke is a bluish-grey rock, composed of small grains of quartz and clay shale, with a few scales of mica. While or yellowish felspar is found in some varieties, and others contain so many fragments of old Jasper, as to have been polished as an ornamental stone; coarse greywackes, in thick beds, with imperfect marks of stratification, are most common on the northern side of the formation. The clay slate is often a more variety of the former, but at other times must be considered as a distinct species; its common colour varies from light grey to dark lead blue, but brown, red, and yellow tints are not uncommon; the texture and aspect very uniform, and its composition principally clay, with a little mica, and a still less portion of quartz. Flinty slate, or Lydian stone, seems in many cases to be more siliceous variety of the clay slate; all the varieties strike fire with steel, and some are nearly pure flint, of a light grey or bluish color; others are dark blue or black, probably from carbonaceous matter, and are the limestone of old authors; its dark carbonaceous aspect frequently causes it to be mistaken for coal, and many laborious, but vain, attempts have been made to reach an inflammable portion of this rock. Nothing can show more strongly the baseness of geological science, since there is not, perhaps, in the whole series of stratified formations, one that holds out less prospect of a successful result. Shale slate is a more variety of the clay slate containing that mineral, from which its name is derived; it is usually softer, more friable, and liable to decay, than the common slate, and is only found in few places, and in small masses. Fossil remains are exceedingly rare—graptolites, and a few shells, being the whole yet found, and not sufficient to connect this formation with the transition rocks of England, the line to enable the various beds to be described in their true order. The igneous rocks have none of a local character than the stratified; the igneous rocks of the transition districts seem to be characterized by the prevalence of felspar or argillaceous matter, those of the primary by quartz or silica, and those of the secondary by granite. With respect to minerals in this first, or transition, division, galena, with sulphuret of copper, is found near Newton, Strathclyde, west of the first granite district, and on the east of it at Woodhead, about two miles north of Carrington, a very rich vein of galena is now wrought. At Abernethy, a vein of iron ore, the red hematite formation, is wrought in the granite. Veins of copper ore have been discovered in many places, but are not now wrought. In the hilly cliffs at Collieston, near the Ure, copper ore has been found in recent times twenty years; many of them veins are very decayed, and are now little more than fossils in the water. North-east of Banffshire are the famous mines of Leadhills and Widdelshill; the whole are contained in a circle of three miles in diameter, yet have yielded both life and cultivation in a most thick and continuous situation 1100 feet above the level of the sea. The ore has yielded from a few inches to four or five, and rarely to six, and also flint. The produce has been variable, from 40,000 lb. to 50,000 lb. per annum at Leadhills, and from 10,000 lb. to 20,000 lb. per annum at Widdelshill. Gold is found in small quantities, sometimes associated with quartz, is found at the outcrop of the vein, and it is said that Sir James Hall, master of the mine at Mount Eliza, employed 300 men for several years searching for gold, and collected 200,000 lb. worth; it is common, however, to be a profitable speculation. Flints weighing one or two ounces were sometimes found, but the two largest pieces for some years have only weighed 60 grs. and 50 grs. In Widdelshill parish, north-east of the Lake, is the extensive mine of Glen-Ross, which during the few years it was open, from 1780 to 1798, produced 190 tons of the sulphuret of antimony, yielding 40 per cent. of metal, worth 8000 lb.; the vein, twenty fathoms wide, contained also quartz, calc spar, and stibnite. The mineral wells at Widdelshill have long been celebrated—Widdelshill Well rising from a bed of pyrites greywacke, and the Widdelshill Spa rising from a collection of shaly slate in a ravine at the foot of a hill of the same name. Dr. Gurney gives the following analysis of a gallon of water

Inverlathen, now a favourite watering place, has also mineral springs: two of them have been analysed, and contain—

Carbonate of magnesia	5.0 grs.	10.2 grs.
Muriate of soda	2.0	1.4
Muriate of soda	21.2	21.9
Total	28.2	33.5

[To be continued in next week's Journal.]

NOTES REGARDING MINING OPERATIONS IN FRANCE, AND CAUTIONS TO ENGLISH ENGINEERS TRANSACTING BUSINESS WITH FOREIGNERS, &c., &c.

Having in a former paper endeavoured to show the prejudicial effects of legislating in matters of private enterprise, it may now be matter of some interest to furnish such details as may give the English miner some idea of the manner of working, the amounts paid to workmen, their manner of living, &c., as contrasted with the English collier. The district already topographically described is occupied in its mining operations by the Marquis de Castellane and the Marcellines Company. The former has, with much liberality and spirit, endeavored to improve the manner of working the colliery, and to introduce English improvements, and, amongst others, a wind-Marcellines. In May, 1843, this engine was erected, and on bringing to surface the first tub of coal, either the engine or the engineer forgot the customary halt usual to commodious banking, and drew it over the head gear into the engine-house. The engineer, on receiving some remonstrance from the police Marquis, fortified his excuses a little, by declaring, as a redoubtable, although he was then that some little provision was requisite for reversing the machine for the usual purposes of winding coal, and also that a utility of the machine became apparent, notwithstanding the blunders of a very bad engineer, who, in his stopping at bank when he should lower the tub upon the tram, frequently pulled the bankman off his legs, and suspended him over the pit—a practice in no wise in accordance with the taste of the latter, who, to avoid future contingencies of a like kind, adopted the precaution of calling to his aid a pole, with an iron hook, which he declared should only be laid aside when the proficiency of the engineer justified it. The rise coal, as has been already said, is reached and brought to the surface by buckets dipping from the bottom, up which a continuous row of a hundred weight of coal, according to their strength. These boys are, according to the custom of the place, exercising, in the meantime, this laborious occupation as a term of probation, prior to attaining the higher two, though rarely, this may be accomplished, if the boy is stout and active, with the exception of a small triangular apron in front of their person. Their appearance under such circumstances predisposes the mind to judge habitual singing and frivolity their volatile temperaments give vent to. The men, as may be expected, partake less in this gaiety, especially after having made their long shift of twelve hours, beginning at four in the morning, 24 c., or about 2s. English money, whilst the boys gain only from one-half to one-third of this amount. They all work by the piece, but a good man can only make this sum with hard work.

It may be asked—How can a man keep a wife and family, pay for his rent, food, and clothing with such humble gains? It may be supposed that food is comparatively cheap to the gains; this is not the case, being too near to Marcellines and Toulon, which absorb most of the agricultural produce—and, consequently, the price becomes enhanced. A pound of beef or mutton costs them 12 sous, or nearly 6d.—the weight being nearly equal to the English, this being 1, and the French pound 1.1. While bread costs 44 sous the pound, and brown 34 sous, which in English money make nearly 24 c., and 14 c. per pound. Sugar and coffee are a few pence, probably fifteen, cheaper than in England, and tobacco is the same price.

In England, a collier possessing prudential habits, fortifies himself for the fatigues he has to undergo by a tolerable allowance of animal food, and a reasonable quantity of ale or beer, which yields its fruits in a more vigorous manner, and, consequently, the price becomes enhanced. A pound of beef or mutton costs them 12 sous, or nearly 6d.—the weight being nearly equal to the English, this being 1, and the French pound 1.1. While bread costs 44 sous the pound, and brown 34 sous, which in English money make nearly 24 c., and 14 c. per pound. Sugar and coffee are a few pence, probably fifteen, cheaper than in England, and tobacco is the same price.

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noting particularly with the most scrupulous exactness. This state of operations continued some time without giving rise to any decided expression of opinion as to the operations of the engine, when their deliberations were suddenly terminated by a summons to appear at the d'oeuvre that had been prepared in an adjoining tent to celebrate the starting—a duty which they were much more able to discuss with ability than that of deferring the process of the engine—a mystery which their powers have never penetrated to the present day. It fortunately occurred for the proprietors, that the French tariff and duties imposed on machinery admits of a total exemption in case of introducing any engine or machine new in principle, or performing work with greater economy and efficiency. In this case the owners claimed a remission of the duty. On application to the Government, they referred to an engine similar in principle, previously erected on the Loire, near Nantes. This engine was made by Messrs. Harvey, of Cornwall, and a splendid piece of workmanship, acting with remarkable accuracy. These gentlemen were in no way answerable for the bungling and inefficient manner in which the pumps were fixed, not being their contract. A similar exemption of duty, amounting to 33 per cent. on the value, was here claimed; but, on trial by the Government engineer, this claim was rejected, as the amount of duty done fell short of an old pumping-engine at or near St. Etienne, owing to the greater half of the water being lost by the leakage in the pumps. On these grounds, the Marcellines Company had an engineer sent from Paris, who pronounced the engine and pumps fulfilling the required conditions, and they had the full remission of the duty made by Government. The engineer who had this contract had taken warning by the mismanagement of the pumps himself, without interference in any way from the company. English engineers putting up, or rather contracting to put up, machinery on the continent, should take the greatest precautions, or they will most assuredly be victimized. Their contract should stipulate conditions which guarantee the engine to fulfil certain conditions, do all the mason and carpenter work themselves, or, if that is not convenient, to have it done exactly to their orders, and to have no interference, as the French are very business with a foreigner, bind him by a written agreement; if he takes of necessity requiring no great exactness in the bargain, and no danger existing but that the affairs will be actually satisfactory, however, for he contemplates some plan of over-reaching. All goes on well, with smiles and bows and politeness, till the time of payment, or the balance is due; the engineer is then made acquainted with a variety of defects in his work, is assured that no further payment will be made, and informed that if he thinks it worth while he may apply for redress to the neighbouring Tribunal of Commerce. These courts administer justice, it must be said, with much impartiality, but it is their custom, in disputes of the above kind, to appoint an arbitrator, who generally contrives to favour his countryman, and leave the Englishman the expense of the arbitration to pay. As an example, and as a warning to English engineers, the writer will give two cases of parties being defrauded of their property, from not having taken proper precautions. The first was a small maker in the north, who furnished a Belgian with a long and a flat rope machine, with engine complete, amounting to a considerable sum; this honest man, in full confidence of the fulfillment of his obligation, dispatched his goods; on arrival, on account of some trifling deviation for the better, rendering them not according to order, coupled with a small delay in the period of delivery, the goods were refused, and ultimately sold to defray expenses, being bought by the party to whom they were consigned. A second instance occurred about eighteen months ago, where a Marcellines used crusher ordered a hydraulic press of a very eminent London house. The order was accepted, and the press shipped—the house never doubting the integrity of the Frenchman. In the mean time, great improvements had been made on the spot, in the manufacture of presses, and, at the same time, a diminution in price—strong inducements, it must be admitted, for a person who laid no pretension to extreme tenderness of conscience to sacrifice his word. No specific bargain on a stamped paper existed—he could not be made liable—he resolved not to receive it, and was here, at all events, strictly a man of his word—he did not receive it, for on being carried to the door of the oil-mill, he had the press thrown down in the street in the Cour Goudille, where it lay for months exposed to the weather. It is much better for persons possessing property—it matters not whether in mining, manufactures, or engineering—to invest their property in their own country, where it can be sold to be under their own control. In France, if a foreigner invests his property in public works—such as a gas company, or a mine, for instance—he must be all submission to the power, who is usually some trader or merchant who has been unsuccessful in business, and contrives to get up a company to get himself installed into office. A company having a certain number of partners, must have such an officer, who possesses very considerable powers, which he often exercises to annoy foreign shareholders. In France, many public institutions, and many of their laws and regulations, are worthy of being adopted in England; but, with some honorable exceptions, the principles that animate them in the private transactions of life, are to gain all they can at the expense of others—cheating, however, the salutary precaution of storing such a course in their accomplishment, as shall not bring them within the action and penalties of the law, which it must be said are most severe, and dealt with the most rigid impartiality.

English workmen, also, often are in leaving England; they form very exalted opinions of the money they will gain, and the bonuses they will receive—delusions which they soon find to their cost. If they can furnish any information which the party in their trade may think may be useful available to their use, they are received coolly, with few wages, and many kindnesses lavished on them, till their knowledge or experience is acquired, when they are politely shown to the door to shift for themselves. A few are employed as engineers at various mines in France, who only obtain their wages by keeping their names in the profound ignorance of all that concerns the engine, and never allowing any but themselves to stop or start. For the use or consumption of mining machinery, France, at present, does not present very good prospects—several large establishments being in a condition to furnish all that is required, among the most efficient of which are the works of Messrs. Schneider, of Creusot, in the southern extremity of Burgundy. These works, once the grand workshops of English manufacturers and founders, of this time furnish employment to only one Englishman, whose services, it is said, cannot be well dispensed with, as the company have in vain tried to find a Frenchman capable of casting large cylinders; these works are very extensive, producing every resource on their property. The price of coal raised from the pits in France, when transported to the coast, is, in a great measure, regulated by that of English coal, which is of superior quality. At Marcellines, for example, the price, under ordinary circumstances, is never high, as English coals arriving there from England regard coal freight more in the character of ballast, as the shipowners depend more for remuneration on the homeward cargo. It is true, in France the coalowner is protected by a duty on foreign coals, but, notwithstanding this, the superior quality of English coal, coupled with the lowness of freight, renders it a formidable opponent to the interest of the French colliery owner. Should events ever bring about a war between England and France, the latter has no need of any foreign supply, as the Rhone would furnish, from its mines near Lyons, all the coal required for the measures of the Mediterranean, and the Loire for that of the ports of Nantes, Bordeaux, &c., as would the canal navigation of the north furnish the coal of Valenciennes at Havre, &c., &c. The district more particularly noticed in these papers, through comparatively at the doors of Marcellines and Toulon, is so insignificant in extent, and so poor in quality, that it will suffer more difference to the coal trade, the present consumption being confined to heating many pits, and used by a few oil-mills at Marcellines, the total amount raised annually amounting 150 tons per day; this is only an approximation, as, in parts of this kind in France, the owners are again exempted from the duty on delivering the quantities of strangers, or rather pay them with great alacrity, overhauling the voluminous treaties with such a multitude of clauses as are calculated to cheat his past, present, and future position, the proprietors, still longer.

New Methods of Preparation for Submergence or Rescue.—M. Henry has made known a new method of precipitating the metallic sulphurets without the use of polyhydrous hydrogen. It consists in taking the metallic sulphurets with the hypophosphite of soda, this salt is more powerful as precipitant, but if hydrochloric acid is added, the sulphurets are immediately precipitated. M. Henry's intention is to construct apparatuses.

ANALYSIS OF WATER.

ANALYSIS OF WATER.		ANALYSIS OF WATER.	
Grains per gallon.	Grains per gallon.	Grains per gallon.	Grains per gallon.
Carbonate of lime	1.0	Sulphate of lime	1.0
Muriate of soda	1.0	Muriate of soda	1.0
Grains per gallon.	Grains per gallon.	Grains per gallon.	Grains per gallon.
Carbonate of lime	1.0	Sulphate of lime	1.0
Muriate of soda	1.0	Muriate of soda	1.0



Read before the British Association, at York, on Saturday, Sept. 29.  
BY MR. W. HUTTON.

[illegible]

**SUPPLY OF PURE WATER TO THE METROPOLIS AND ITS SUBURBS—PROPOSED NEW COMPANY.**

generally. On the simplicity.—That although the principle of the Acts of Parliament under which the present Companies supporting the auxiliary portion of the railways with loans has constituted was to encourage competition, an arrangement was sometimes entered into between the said companies, in which competition was put on and so, and a monopoly of a segment of life virtually established. The history of an arrangement of this nature,

**NEW CAST METAL FURNACE.**—Moses, Smith and Ashburn, of County, have invented a glass for heating steel to a red heat, by placing only 10 pounds less of a special cast metal furnace, nearly similar in appearance to a stove. The furnace was tried at Westwich, a few days since, when the steel was subjected six times, at five different sections, to the above cast alloy, and, after the furnace was heated, which occupied an hour and three-quarters in the first instance, the heat became so great that the steel was heated red hot in twenty minutes, and afterwards in less than a quarter of an hour. The reaction appears the opposite to the rough grating bituminous sand, and it does not consume much fuel. It appears to be found in such a manner that it is a case of power it would serve the purpose admirably of heating steel to furnace temperature, and only require some modifications to regulate the strength according to the state of the steel, to render it highly useful for many purposes.

**FRANCIS RAYMOND.**—Contracts for Supply New Commission, with the London, were awarded yesterday at the office of the Minister of Public Works, in these terms: the first was made to M. Cayrol, at 40,000; the second to M. Schmitt, at 47,000; and the third to Messrs. Gressens and Collin, at 42,000; per Commission, with no appreciation. A contract for 100,000 tons of iron was awarded to Messrs. Salomon & Gredy, at 2075, plus plus. —*Guillaume, Telegraph.*